

12. Drive Cycle

A: PROCEDURE

For the troubleshooting, there are driving patterns described below. Driving in the specified pattern allows to diagnose malfunctioning items listed below. After the repair of the following trouble items, be sure to drive the vehicle with the specified drive patterns to check whether the function is resumed correctly.

1. PREPARATION FOR DRIVE CYCLE

- 1) Check battery voltage is more than 12 V and fuel remains half [20 — 40 ℥ (5.3 — 10.6 US gal, 4.4 — 8.8 Imp gal)].
- 2) After performing the diagnostics and clearing the memory, check for any remaining unresolved trouble data. <Ref. to EN(H6DO)(diag)-54, Clear Memory Mode.>
- 3) Disconnect the delivery (test) mode connector.

NOTE:

- Except for the water temperature specified items at starting, be sure to carry out the diagnosis after the engine is warmed up.
- Perform the diagnosis twice if the DTC marked with *. After completing the first diagnosis, stop the engine and perform second diagnosis in same condition.

2. DRIVE CYCLE A — DRIVE THE VEHICLE WITH 80 KM/H (50 MPH) FOR 20 MINUTES, AND IDLE THE ENGINE FOR A MINUTE

DTC	Item	Condition
*P0125	Insufficient Coolant Temperature for Closed Loop Fuel Control	Engine coolant temperature at engine start is less than 20°C (68°F).
*P0128	Coolant Thermostat (Engine Coolant Temperature Below Thermostat Regulating Temperature)	—
*P0133	O2 Sensor Circuit Slow Response (Bank 1 Sensor 1)	—
*P0153	O2 Sensor Circuit Slow Response (Bank 2 Sensor 1)	—
*P0171	System Too Lean (Bank 1)	Complete diagnosis with drive cycle B or C as well.
*P0172	System Too Rich (Bank 1)	Complete diagnosis with drive cycle B or C as well.
*P0174	System Too Lean (Bank 2)	Complete diagnosis with drive cycle B or C as well.
*P0175	System Too Rich (Bank 2)	Complete diagnosis with drive cycle B or C as well.
*P0196	Engine Oil Temperature Sensor Circuit Range/Performance	—
*P0301	Cylinder 1 Misfire Detected	Complete diagnosis with drive cycle B or C as well.
*P0302	Cylinder 2 Misfire Detected	Complete diagnosis with drive cycle B or C as well.
*P0303	Cylinder 3 Misfire Detected	Complete diagnosis with drive cycle B or C as well.
*P0304	Cylinder 4 Misfire Detected	Complete diagnosis with drive cycle B or C as well.
*P0305	Cylinder 5 Misfire Detected	Complete diagnosis with drive cycle B or C as well.
*P0306	Cylinder 6 Misfire Detected	Complete diagnosis with drive cycle B or C as well.
*P0420	Catalyst System Efficiency below Threshold (Bank 1)	—
*P0442	Evaporative Emission Control System Leak Detected (Small Leak)	Engine coolant temperature at engine start is less than 25°C (77°F).
*P0451	Evaporative Emission Control System Pressure Sensor	—
*P0456	Evaporative Emission Control System Leak Detected (Very Small Leak)	Engine coolant temperature at engine start is less than 25°C (77°F).
*P0457	Evaporative Emission Control System Leak Detected (Fuel Cap Loose/Off)	Engine coolant temperature at engine start is less than 25°C (77°F).
*P0464	Fuel Level Sensor Circuit Intermittent	—
P1443	Vent Control Solenoid Valve Function Problem	—
*P2096	Post Catalyst Fuel Trim System Too Lean (Bank 1)	Complete diagnosis with drive cycle B or C as well.
*P2097	Post Catalyst Fuel Trim System Too Rich (Bank 1)	Complete diagnosis with drive cycle B or C as well.
*P2098	Post Catalyst Fuel Trim System Too Lean Bank 2	Complete diagnosis with drive cycle B or C as well.
*P2099	Post Catalyst Fuel Trim System Too Rich Bank 2	Complete diagnosis with drive cycle B or C as well.

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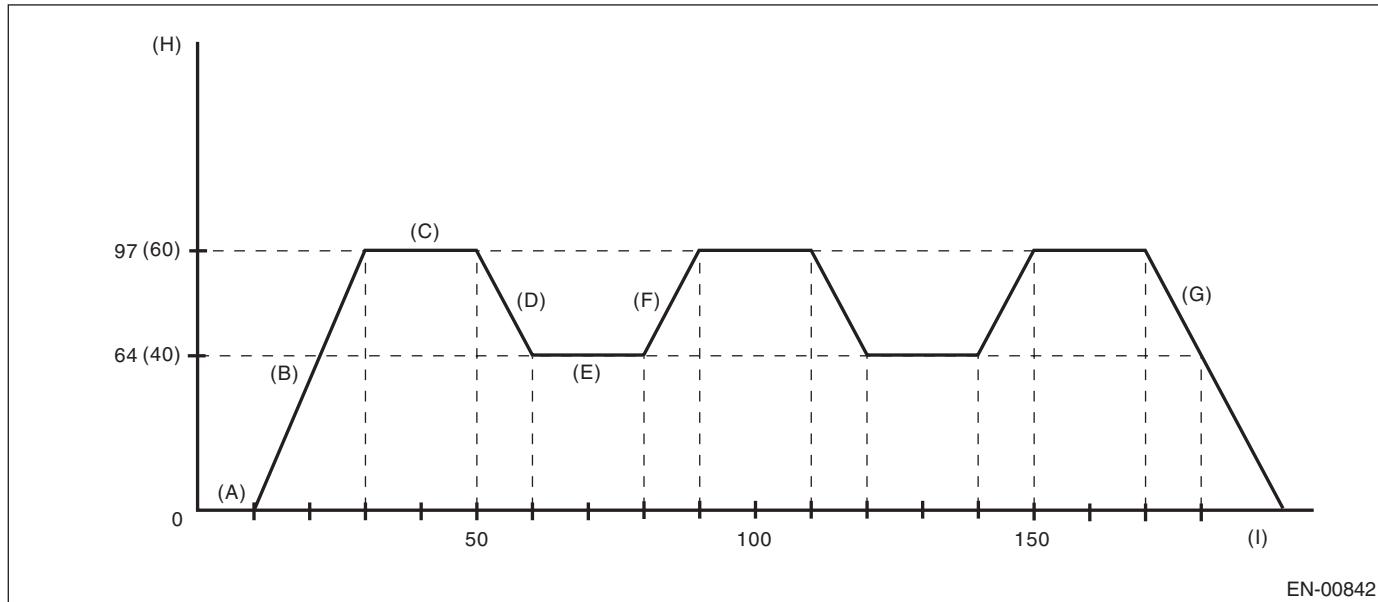
3. DRIVE CYCLE B — 10 MINUTES IDLING

NOTE:

Drive the vehicle at 10 km/h (6 MPH) or faster before diagnosis.

DTC	Item	Condition
*P0126	Insufficient Engine Coolant Temperature for Stable Operation	—
*P0171	System Too Lean (Bank 1)	Complete diagnosis with drive cycle A or C as well.
*P0172	System Too Rich (Bank 1)	Complete diagnosis with drive cycle A or C as well.
*P0174	System Too Lean (Bank 2)	Complete diagnosis with drive cycle A or C as well.
*P0175	System Too Rich (Bank 2)	Complete diagnosis with drive cycle A or C as well.
*P0301	Cylinder 1 Misfire Detected	Complete diagnosis with drive cycle A or C as well.
*P0302	Cylinder 2 Misfire Detected	Complete diagnosis with drive cycle A or C as well.
*P0303	Cylinder 3 Misfire Detected	Complete diagnosis with drive cycle A or C as well.
*P0304	Cylinder 4 Misfire Detected	Complete diagnosis with drive cycle A or C as well.
*P0305	Cylinder 5 Misfire Detected	Complete diagnosis with drive cycle A or C as well.
*P0306	Cylinder 6 Misfire Detected	Complete diagnosis with drive cycle A or C as well.
*P0459	Evaporative Emission System Purge Control Valve Circuit High	—
*P0506	Idle Air Control System RPM Lower Than Expected	—
*P0507	Idle Air Control System RPM Higher Than Expected	—
*P2096	Post Catalyst Fuel Trim System Too Lean (Bank 1)	Complete diagnosis with drive cycle A or C as well.
*P2097	Post Catalyst Fuel Trim System Too Rich (Bank 1)	Complete diagnosis with drive cycle A or C as well.
*P2098	Post Catalyst Fuel Trim System Too Lean Bank 2	Complete diagnosis with drive cycle A or C as well.
*P2099	Post Catalyst Fuel Trim System Too Rich Bank 2	Complete diagnosis with drive cycle A or C as well.

4. DRIVE CYCLE C — DRIVE THE VEHICLE WITH FOLLOWING DRIVE PATTERNS



(A) Idle the engine for more than 10 seconds.
(B) Accelerate the vehicle to 97 km/h (60 MPH) within 20 seconds.
(C) Drive the vehicle at 97 km/h (60 MPH) for 20 seconds.
(D) Decelerate the vehicle to 64 km/h (40 MPH) with throttle fully closed.
(E) Drive the vehicle at 64 km/h (40 MPH) for 20 seconds.
(F) Accelerate the vehicle to 97 km/h (60 MPH) within 10 seconds.
(G) Stop the vehicle with throttle fully closed.
(H) Vehicle speed km/h (MPH)
(I) Sec.

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DTC	Item	Condition
*P0030	HO2S Heater Control Circuit (Bank 1 Sensor 1)	—
*P0050	HO2S Heater Control Circuit (Bank 2 Sensor 1)	—
*P0068	Manifold Pressure Sensor Range/Performance	—
*P0101	Mass or Volume Air Flow Circuit Range/Performance	—
P0134	O2 Sensor Circuit No Activity Detected (Bank 1 Sensor 1)	—
*P0139	O2 Sensor Circuit Slow Response (Bank 1 Sensor 2)	—
P0154	O2 Sensor Circuit No Activity Detected (Bank 2 Sensor 1)	—
*P0159	O2 Sensor Circuit Slow Response (Bank 2 Sensor 2)	—
*P0171	System Too Lean (Bank 1)	Complete diagnosis with drive cycle A or B as well.
*P0172	System Too Rich (Bank 1)	Complete diagnosis with drive cycle A or B as well.
*P0174	System Too Lean (Bank 2)	Complete diagnosis with drive cycle A or B as well.
*P0175	System Too Rich (Bank 2)	Complete diagnosis with drive cycle A or B as well.
*P0301	Cylinder 1 Misfire Detected	Complete diagnosis with drive cycle A or B as well.
*P0302	Cylinder 2 Misfire Detected	Complete diagnosis with drive cycle A or B as well.
*P0303	Cylinder 3 Misfire Detected	Complete diagnosis with drive cycle A or B as well.
*P0304	Cylinder 4 Misfire Detected	Complete diagnosis with drive cycle A or B as well.
*P0305	Cylinder 5 Misfire Detected	Complete diagnosis with drive cycle A or B as well.
*P0306	Cylinder 6 Misfire Detected	Complete diagnosis with drive cycle A or B as well.
*P0400	EGR System Malfunction	—
P1492	EGR Solenoid Valve Signal #1 Circuit Malfunction (Low Input)	—
P1493	EGR Solenoid Valve Signal #1 Circuit Malfunction (High Input)	—
P1494	EGR Solenoid Valve Signal #2 Circuit Malfunction (Low Input)	—
P1495	EGR Solenoid Valve Signal #2 Circuit Malfunction (High Input)	—
P1496	EGR Solenoid Valve Signal #3 Circuit Malfunction (Low Input)	—
P1497	EGR Solenoid Valve Signal #3 Circuit Malfunction (High Input)	—
P1498	EGR Solenoid Valve Signal #4 Circuit Malfunction (Low Input)	—
P1499	EGR Solenoid Valve Signal #4 Circuit Malfunction (High Input)	—
*P2096	Post Catalyst Fuel Trim System Too Lean (Bank 1)	Complete diagnosis with drive cycle A or B as well.
*P2097	Post Catalyst Fuel Trim System Too Rich (Bank 1)	Complete diagnosis with drive cycle A or B as well.
*P2098	Post Catalyst Fuel Trim System Too Lean Bank 2	Complete diagnosis with drive cycle A or B as well.
*P2099	Post Catalyst Fuel Trim System Too Rich Bank 2	Complete diagnosis with drive cycle A or B as well.

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5. DRIVE CYCLE D

DRIFT DIAGNOSIS

- 1) Make sure that the engine coolant temperature at engine starting is less than 30°C (86°F).
- 2) Make sure that fuel remains 9.6 ℥ (2.5 US gal, 2.1 Imp gal) or more and the battery voltage is 10.9 V or more.
- 3) Start the engine, and check that the engine coolant temperature increases by 10°C (18°F) or more, and reaches 75°C (167°F) or more, when the engine is warmed up.
- 4) After the engine has reached the state of procedure 3), idle the engine for 120 seconds or more.

STUCK DIAGNOSIS

- 1) Make sure that the battery voltage is 10.9 V or more.
- 2) Perform the Clear Memory Mode. <Ref. to EN(H6DO)(diag)-54, Clear Memory Mode.>
- 3) Drive for approximately 50 ℥ (13.2 US gal, 11 Imp gal) of fuel.

NOTE:

- It is acceptable to drive the vehicle intermittently.
- Do not disconnect the battery terminals while diagnosing. (Data will be cleared by disconnecting the battery terminals.)

DTC	Item	Condition
P0181	Fuel Temperature Sensor "A" Circuit Range/Performance	—

6. DRIVE CYCLE E

- 1) Make sure that the battery voltage is 10.9 V or more.
- 2) Perform the Clear Memory Mode. <Ref. to EN(H6DO)(diag)-54, Clear Memory Mode.>
- 3) Drive for approximately 30 ℥ (7.9 US gal, 6.6 Imp gal) of fuel.

NOTE:

- It is acceptable to drive the vehicle intermittently.
- Do not disconnect the battery terminals while diagnosing. (Data will be cleared by disconnecting the battery terminals.)

DTC	Item	Condition
P0461	Fuel Level Sensor "A" Circuit Range/Performance	—

7. DRIVE CYCLE F

- 1) Make sure that the engine coolant temperature at engine starting is less than 30°C (86°F).
- 2) Start the engine, and warm it up until engine coolant temperature increases over 95°C (203°F).
- 3) Idle the engine for more than 10 minutes in the condition of step 2.

NOTE:

Do not disconnect the battery terminals while diagnosing. (Data will be cleared by disconnecting the battery terminals.)

DTC	Item	Condition
P0111	Intake Air Temperature Sensor 1 Circuit Range/Performance	—

8. DRIVE CYCLE H

- 1) Perform the Clear Memory Mode. <Ref. to EN(H6DO)(diag)-54, Clear Memory Mode.>
- 2) With the ignition switch ON, read the engine coolant temperature, intake air temperature and fuel temperature. <Ref. to EN(H6DO)(diag)-35, READ CURRENT DATA FOR ENGINE (NORMAL MODE), OPERATION, Subaru Select Monitor.>
- 3) If the values from step 2) satisfy the following two conditions, start the engine.

Condition:

Engine coolant temperature – intake air temperature $\leq 5^{\circ}\text{C}$ (41°F)

Engine coolant temperature – fuel temperature $\leq 2^{\circ}\text{C}$ (36°F)

NOTE:

- If the conditions are not satisfied, turn the ignition switch to OFF and wait until the parameters are satisfied.
- Start AT vehicles in the P range, and MT vehicles in the N position.
- Idle the engine for 1 minute under the conditions in step 2).

Do not disconnect the battery terminals while diagnosing. (Data will be cleared by disconnecting the battery terminals.)

DTC	Item	Condition
*P1602	Control Module Programming Error	—